T-MOBILE
MOBILITY COST MODEL - METHODS AND OUTPUT

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Presented by CostQuest Associates

Cost Model Overview

CostQuest developed a Forward Looking Economic Cost Model that estimates the costs for wireless mobility which provides a platform to investigate high-cost support issues

The Cost Model is based on:

- An application which realistically models the appropriate investments and costs to operate and maintain a 4G mobile network
- Methodologies that are consistent with FCC objectives in developing Forward Looking Costs for universal service
- Methodologies that are consistent with recent efforts by the FCC to understand the cost of broadband deployment
- A design that captures the upfront investment to deploy and the ongoing cost to maintain a 4G mobile network
- The assumption that there will be deployment of HSDPA+, LTE and/or WiMAX technologies and these networks will be sensitive to the size of demand, frequency propagation, geography of the study area and network engineering characteristics
- The notion that operational costs are incurred by an efficient provider along with the capital costs associated with the network deployment

Cost Model Results

- We performed a complete comparative analysis for fifteen states
  - Arizona, Colorado, Florida, Georgia, Hawaii, Idaho, Kentucky, Louisiana, Minnesota, Mississippi, North Carolina, New Mexico, Oregon, Texas, and Washington
  - These states were chosen as they offer varying topographies and population densities as well as engaged state regulatory commissions
- The model results show a stark difference between the 700MHz investment and the 1900MHz investment
  - On average, across all fifteen states, the model shows that the 1900MHz build requires nearly 300% more in total investment

Cost Model Funding Differentials

Total Est. Annual Funding Needed			
	700MHz	1900MHz	% Difference
Arizona	$19,241,557	$57,752,708	200%
Colorado	$16,659,640	$58,559,001	252%
Florida	$1,721,422	$9,458,345	449%
Georgia	$5,147,021	$39,242,541	662%
Hawaii	$521,517	$1,610,316	209%
Idaho	$15,195,767	$38,089,762	151%
Kentucky	$591,039	$13,048,924	2108%
Louisiana	$442,023	$8,819,237	1895%
Minnesota	$2,994,023	$32,475,339	985%
Mississippi	$1,497,479	$12,153,013	712%
North Carolina	$2,491,848	$25,037,044	905%
New Mexico	$20,123,991	$32,475,339	61%
Oregon	$17,675,756	$53,855,778	205%
Texas	$18,563,022	$79,178,026	327%
Washington	$9,348,960	$38,924,421	316%
All States	*$132,215,066*	*$500,679,793*	279%

Appendix

Cost Model Overview

Coverage Determination

- Utilizing industry service data on wireless network deployments as of the end of 2011 a determination was made regarding the extent of 4G wireless coverage in the jurisdictions modeled

Coverage Analysis

- Each modeled state jurisdiction was divided into areas approximating the coverage of a single wireless base station using spectrum currently available to commercial mobile radio service providers (cell coverage areas)
    - For this study, coverage characteristics were developed in concert with T-Mobile network planning

Capital Investment Development

- Based on the count of cell coverage areas and an assumed mix of owned and leased tower sites, an investment profile (derived from industry sources) was developed and applied to the count of cell coverage areas requiring leased space on existing structures and the count of cell coverage areas requiring a tower build
    - The model also develops the backhaul and core network investments

Cost Model Overview

Monthly Expense Development

- Representative U.S. domestic wireless average operational expenses for network, customer, general, and administrative functions were analyzed to develop cost inputs that were driven on either cell coverage area or the number of subscribers
- Investment cost annualization, which captures depreciation along with financing costs and taxes, was included with operational expenses to produce a total monthly expense

Cost per Sub

- From the results for each site, a monthly cost per user per census block

Commercial Viability

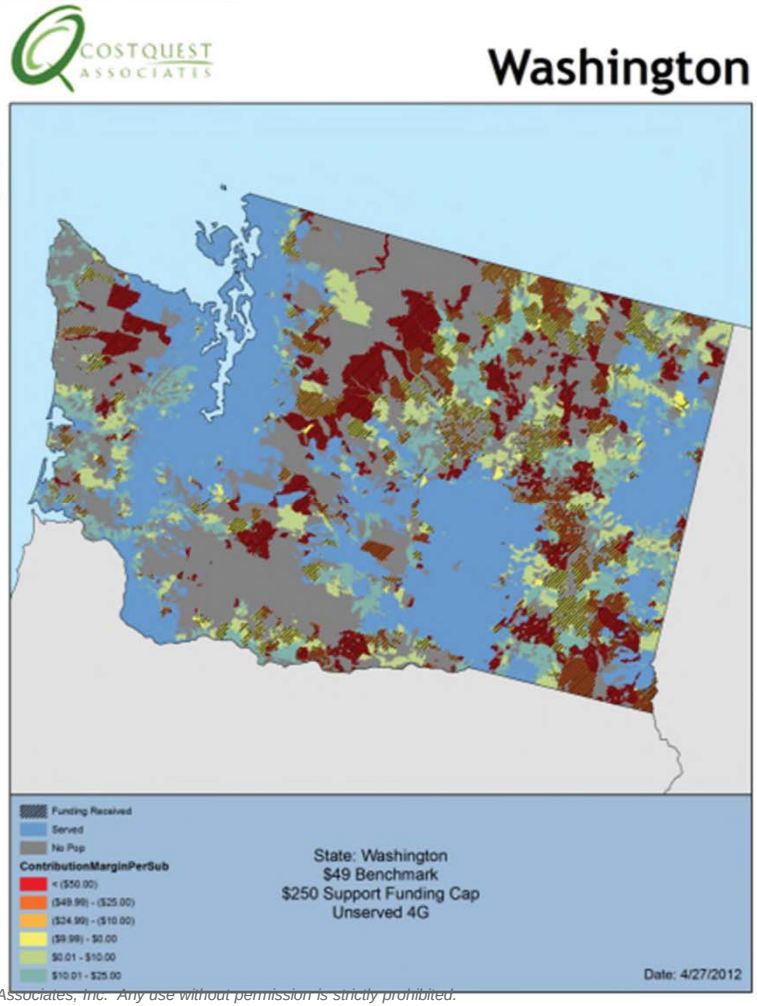
- Estimated monthly service revenues were compared to the monthly costs of owning and operating 4G network and services to determine a contribution margin for each census block
- A census block with a positive contribution margin is considered commercially viable
- A census block with a negative contribution margin is assumed to require additional support for a commercial operator to provide service

Cost Model Overview

Key Assumptions

- The model uses a single network deploying mobile broadband to levelized (over 6 years) demand of 60% for consumers and 32% for businesses
- The model assumes an Average Revenue per User (ARPU) benchmark of $49
  - Costs below this amount are not funded
- The Model includes a threshold for funding (funding cap) at $250 per month
  - This means that census blocks requiring a monthly support level in excess of $250 per user would not be funded
- As part of the state analyses, we are assuming costs of just one provider's network
- …700Mhz assumptions on coverage
- …1900Mhz assumptions on coverage

700MHz Contribution Map



1900MHz Contribution Map